FND

PCT10

RAW SEQUENCE LISTING   DATE: 05/22/2002
PATENT APPLICATION: US/10/018,290A   TIME: 13:47:32

Input Set : A:\DAVI149SEQLIST.TXT
Output Set: N:\CRF3\05222002\J018290A.raw

```
 4 <110> APPLICANT: Hasse, Detlef
 5         Panaccio, Michael
 6         Sinistaj, Meri
 8 <120> TITLE OF INVENTION: LAWSONIA DERIVED GENE AND RELATED OMPH
 9         POLYPEPTIDES, PEPTIDES, AND PROTEINS AND THEIR USES
12 <130> FILE REFERENCE: DAVI149.001APC
14 <140> CURRENT APPLICATION NUMBER: US 10/018,290A
15 <141> CURRENT FILING DATE: 2002-04-16
17 <150> PRIOR APPLICATION NUMBER: PCT/AU00/00438
18 <151> PRIOR FILING DATE: 2000-05-11
20 <150> PRIOR APPLICATION NUMBER: US 60/133,986
21 <151> PRIOR FILING DATE: 1999-05-13
23 <160> NUMBER OF SEQ ID NOS: 13
25 <170> SOFTWARE: FastSEQ for Windows Version 4.0
27 <210> SEQ ID NO: 1
28 <211> LENGTH: 186
29 <212> TYPE: PRT
30 <213> ORGANISM: Lawsonia intracellularis
32 <400> SEQUENCE: 1
33 Met Lys Val Lys Thr Leu Ser Met Ala Ile Leu Ala Cys Leu Leu Val
34 1               5                   10                  15
35 Ala Asn Ser Ala Phe Ser Ala Asp Phe Pro Ile Gly Val Phe Asn Ser
36             20                  25                  30
37 Gln Ser Ile Ala Met Glu Ser Glu Ala Ala Lys Ala Ala Gln Lys Lys
38             35                  40                  45
39 Leu Gln Ser Glu Phe Gly Asn Glu Lys Thr Gln Leu Glu Lys Gln Ala
40     50                  55                  60
41 Lys Asp Leu Gln Thr Lys Ala Asp Asp Leu Gln Ala Lys Ser Ala Ala
42 65                  70                  75                  80
43 Met Ser Asn Gln Ala Arg Glu Asp Lys Gln Arg Glu Phe Leu Glu Leu
44             85                  90                  95
45 Arg Arg Asn Phe Glu Glu Lys Ser Arg Asp Phe Ala Ile Arg Val Glu
46             100                 105                 110
47 Gln Ala Glu Asn Thr Leu Arg Gln Tyr Leu Ala Glu Gln Ile Tyr Leu
48             115                 120                 125
49 Ala Ala Glu Thr Ile Ala Lys Lys Lys Gly Leu Lys Leu Val Leu Asp
50     130                 135                 140
51 Ser Ala Ser Gly Ser Val Met Tyr Leu Glu Lys Asn Leu Asp Ile Thr
52 145                 150                 155                 160
53 Lys Glu Ile Leu Glu Ala Ile Asn Ala Ala Trp Lys Lys Gly Gly Ser
54             165                 170                 175
55 Lys Leu Pro Glu Met Ala Asn Arg Lys Lys
56             180                 185
```

RAW SEQUENCE LISTING   DATE: 05/22/2002
PATENT APPLICATION: US/10/018,290A   TIME: 13:47:32

Input Set : A:\DAVI149SEQLIST.TXT
Output Set: N:\CRF3\05222002\J018290A.raw

```
 59 <210> SEQ ID NO: 2
 60 <211> LENGTH: 561
 61 <212> TYPE: DNA
 62 <213> ORGANISM: Lawsonia intracellularis
 64 <220> FEATURE:
 65 <221> NAME/KEY: CDS
 66 <222> LOCATION: (1)...(561)
 68 <400> SEQUENCE: 2
 69 atg aaa gta aaa act ctt tcc atg gct att tta gct tgt tta tta gta        48
 70 Met Lys Val Lys Thr Leu Ser Met Ala Ile Leu Ala Cys Leu Leu Val
 71  1               5                   10                  15
 73 gct aac agt gca ttt tcg gct gac ttc cct att ggt gtc ttt aat tct        96
 74 Ala Asn Ser Ala Phe Ser Ala Asp Phe Pro Ile Gly Val Phe Asn Ser
 75                  20                  25                  30
 77 caa tcc att gcc atg gag agt gaa gca gct aag gcc gct caa aaa aaa       144
 78 Gln Ser Ile Ala Met Glu Ser Glu Ala Ala Lys Ala Ala Gln Lys Lys
 79          35                  40                  45
 81 tta caa tca gaa ttt ggt aat gaa aaa aca caa ctt gaa aaa caa gca       192
 82 Leu Gln Ser Glu Phe Gly Asn Glu Lys Thr Gln Leu Glu Lys Gln Ala
 83      50                  55                  60
 85 aaa gat ttg caa aca aaa gct gat gat tta caa gct aag tca gca gct       240
 86 Lys Asp Leu Gln Thr Lys Ala Asp Asp Leu Gln Ala Lys Ser Ala Ala
 87  65                  70                  75                  80
 89 atg tct aac caa gca cgt gaa gat aaa caa aga gaa ttt ctt gaa ctt       288
 90 Met Ser Asn Gln Ala Arg Glu Asp Lys Gln Arg Glu Phe Leu Glu Leu
 91                  85                  90                  95
 93 cgt cgt aat ttc gaa gaa aaa tct cgt gac ttt gca ata cgt gtc gaa       336
 94 Arg Arg Asn Phe Glu Glu Lys Ser Arg Asp Phe Ala Ile Arg Val Glu
 95                  100                 105                 110
 97 caa gct gaa aac aca tta cgt caa tat cta gct gaa caa atc tat ctt       384
 98 Gln Ala Glu Asn Thr Leu Arg Gln Tyr Leu Ala Glu Gln Ile Tyr Leu
 99          115                 120                 125
101 gct gct gaa act ata gca aaa aag aaa ggg tta aaa ctt gtt ctt gat       432
102 Ala Ala Glu Thr Ile Ala Lys Lys Lys Gly Leu Lys Leu Val Leu Asp
103      130                 135                 140
105 agt gct agt gga agt gta atg tac ctt gaa aaa aat cta gat att aca       480
106 Ser Ala Ser Gly Ser Val Met Tyr Leu Glu Lys Asn Leu Asp Ile Thr
107 145                 150                 155                 160
109 aaa gaa att ctt gaa gcc ata aat gct gca tgg aaa aaa ggt gga agt       528
110 Lys Glu Ile Leu Glu Ala Ile Asn Ala Ala Trp Lys Lys Gly Gly Ser
111                  165                 170                 175
113 aaa ctt cca gag atg gca aac cgg aaa aaa taa                           561
114 Lys Leu Pro Glu Met Ala Asn Arg Lys Lys  *
115                  180                 185
118 <210> SEQ ID NO: 3
119 <211> LENGTH: 23
120 <212> TYPE: DNA
121 <213> ORGANISM: Artificial Sequence
123 <220> FEATURE:
```

RAW SEQUENCE LISTING   DATE: 05/22/2002
PATENT APPLICATION: US/10/018,290A   TIME: 13:47:32

Input Set : A:\DAVI149SEQLIST.TXT
Output Set: N:\CRF3\05222002\J018290A.raw

124 <223> OTHER INFORMATION: oligonucleotide primer RA176 forward
126 <400> SEQUENCE: 3
127 tttattcatt cagaaggagc ttc   23
129 <210> SEQ ID NO: 4
130 <211> LENGTH: 21
131 <212> TYPE: DNA
132 <213> ORGANISM: Artificial Sequence
134 <220> FEATURE:
135 <223> OTHER INFORMATION: oligonucleotide primer RA177 reverse
137 <400> SEQUENCE: 4
138 aagtttagca atttctgaaa g   21
140 <210> SEQ ID NO: 5
141 <211> LENGTH: 143
142 <212> TYPE: PRT
143 <213> ORGANISM: Yersinia pseudotuberculosis
145 <400> SEQUENCE: 5
146 Ser Ser Ile Phe Gln Gln Leu Pro Ala Arg Glu Ala Val Ala Ala Gly
147 1   5   10   15
148 Lys Lys Gln Leu Glu Asn Glu Phe Lys Gly Arg Ala Thr Glu Leu Gln
149   20   25   30
150 Gly Ile Ala Ile Val Asn Val Met Glu Arg Asp Leu Gln Thr Lys Met
151   35   40   45
152 Gln Lys Leu Gln Arg Asp Gly Ser Thr Met Lys Ala Ser Asp Arg Thr
153   50   55   60
154 Lys Ile Leu Ser Arg Ile Gln Asp Ala Val Lys Ser Val Ala Thr Leu
155 65   70   75   80
156 Glu Asn Glu Val Met Lys Gln Arg Glu Thr Lys Gly Gly Tyr Asp Val
157   85   90   95
158 Val Ile Asp Ala Asn Ala Val Ala Tyr Ala Asp Ser Ser Phe Ser Thr
159   100   105   110
160 Lys Ala Gln Ala Phe Glu Gln Asp Asn Arg Arg Arg Gln Ala Glu Glu
161   115   120   125
162 Arg Asn Lys Lys Asp Ile Thr Ala Asp Val Leu Lys Gln Val Lys
163   130   135   140
166 <210> SEQ ID NO: 6
167 <211> LENGTH: 164
168 <212> TYPE: PRT
169 <213> ORGANISM: Yersinia enterocolitica
171 <400> SEQUENCE: 6
172 Met Lys Lys Ser Ser Ile Phe Gln Gln Leu Pro Ala Arg Glu Thr Val
173 1   5   10   15
174 Ala Trp Leu Cys Ala Ala Ser Leu Gly Leu Ala Leu Ala Ala Ser Ala
175   20   25   30
176 Arg Val Gln Ala Ala Lys Ile Lys Gln Leu Glu Asn Glu Phe Lys Gly
177   35   40   45
178 Arg Ala Thr Glu Leu Gln Gly Ala Ile Val Asn Val Met Glu Arg Asp
179   50   55   60
180 Leu Gln Thr Lys Met Gln Lys Leu Gln Arg Asp Gly Ser Thr Met Lys
181 65   70   75   80

RAW SEQUENCE LISTING   DATE: 05/22/2002
PATENT APPLICATION: US/10/018,290A   TIME: 13:47:33

Input Set : A:\DAVI149SEQLIST.TXT
Output Set: N:\CRF3\05222002\J018290A.raw

```
182 Ala Ser Asp Arg Thr Lys Ile Leu Ser Arg Ile Gln Asp Ala Val Lys
183             85              90              95
184 Ser Val Ala Ser Leu Glu Asn Asp Val Met Lys Gln Arg Glu Thr Lys
185             100             105             110
186 Gly Gly Tyr Asp Val Val Ile Asp Ala Asn Ala Val Ala Tyr Ala Asp
187         115             120             125
188 Pro Ser Phe Ser Thr Lys Ala Gln Ala Phe Glu Gln Asp Asn Arg Arg
189     130             135             140
190 Arg Gln Met Glu Glu Arg Asn Lys Lys Asp Ile Thr Ala Asp Val Leu
191 145             150             155             160
192 Lys Gln Val Lys
196 <210> SEQ ID NO: 7
197 <211> LENGTH: 197
198 <212> TYPE: PRT
199 <213> ORGANISM: Haemophilus influenzae
201 <400> SEQUENCE: 7
202 Met Lys Asn Ile Gly Tyr Ile Phe Gln His His Pro Asp Arg Gln Ala
203 1               5               10              15
204 Val Ala Ala Lys Val Thr Ala Leu Ala Leu Gly Ile Ala Leu Ala Ser
205             20              25              30
206 Gly Tyr Ala Ser Ala Glu Glu Lys Asp Lys Leu Asp Ala Glu Phe Lys
207         35              40              45
208 Pro Val Ala Glu Lys Leu Ala Ala Ser Lys Ile Ala Phe Ile Asn Ala
209     50              55              60
210 Lys Glu Val Asp Asp Lys Ile Ala Ala Ala Arg Lys Lys Val Glu Ala
211 65              70              75              80
212 Lys Val Ala Ala Leu Glu Lys Asp Ala Pro Arg Leu Arg Gln Ala Asp
213             85              90              95
214 Ile Gln Lys Leu Leu Asp Ser Ile Gln Thr Ala Thr Asn Asn Leu Ala
215             100             105             110
216 Lys Arg Gln Gln Glu Ile Asn Lys Leu Gly Ala Ala Glu Asp Ala Glu
217         115             120             125
218 Leu Gln Lys Leu Met Gln Glu Ala Lys Gly Tyr Thr Tyr Val Leu Asp
219     130             135             140
220 Ala Asn Ser Ile Val Phe Ala Val Glu Gly Leu Arg Lys Leu Gln Val
221 145             150             155             160
222 Glu Ala Gln Ser Lys Leu Ser Arg Lys Lys Ala Glu Leu Glu Lys Met
223             165             170             175
224 Lys Asp Ile Thr Glu Glu Val Leu Lys Ser Ile Pro Ala Ser Glu Lys
225             180             185             190
226 Ala Gln Glu Lys Lys
227         195
230 <210> SEQ ID NO: 8
231 <211> LENGTH: 162
232 <212> TYPE: PRT
233 <213> ORGANISM: Aquifex aeolicus
235 <400> SEQUENCE: 8
236 Met Glu Gly Asn Lys Val Ile Arg Glu Ser Lys Phe Ile Ala Lys Ala
237 1               5               10              15
```

RAW SEQUENCE LISTING   DATE: 05/22/2002
PATENT APPLICATION: US/10/018,290A   TIME: 13:47:33

Input Set : A:\DAVI149SEQLIST.TXT
Output Set: N:\CRF3\05222002\J018290A.raw

```
238 Gln Ile Met Lys Lys Phe Phe Ala Leu Met Thr Leu Ile Ala Gly Ile
239             20                25                30
240 Ser Phe Ser Leu Asp Thr Glu Leu Arg Lys Glu Leu Glu Lys Tyr Gln
241         35                40                45
242 Lys Leu Ile Gln Glu Phe Ala Cys Val Asp Thr Lys Gln Lys Lys Leu
243     50                55                60
244 Glu Ala Leu Lys Lys Ser Leu Glu Ser Lys Ala Leu Ser Glu Lys Ala
245 65                70                75                80
246 Lys Glu Lys Val Phe Asp Lys Val Ile Lys Ile Val Glu Ser Thr Ala
247             85                90                95
248 Lys Lys Ala Lys Glu Ile Glu Gln Leu Glu Asp Glu Lys Lys Lys Ile
249         100               105               110
250 Lys Ala Val Phe Asp Cys Asn Ser Met Leu Tyr Trp Asp Lys Lys Leu
251         115               120               125
252 Arg Lys Leu Gln Val Glu Ala Gln Ser Lys Leu Ser Arg Lys Lys Ala
253     130               135               140
254 Glu Leu Glu Lys Met Ile Asp Ile Thr Asn Glu Val Leu Lys Glu Leu
255 145               150               155               160
256 Asp Lys
260 <210> SEQ ID NO: 9
261 <211> LENGTH: 161
262 <212> TYPE: PRT
263 <213> ORGANISM: Escherichia coli
265 <400> SEQUENCE: 9
266 Met Lys Lys Gly Ser Leu Phe Gln Gln Val Ala Gln Lys Thr Gly Val
267 1             5                10                15
268 Ser Trp Leu Leu Ala Ala Gly Leu Gly Leu Ala Leu Ala Thr Ser Ala
269             20                25                30
270 Gln Ala Ala Asp Lys Ile Asn Thr Leu Glu Asn Glu Phe Lys Gly Arg
271         35                40                45
272 Ala Ser Glu Leu Gln Arg Ala Ile Val Asn Met Met Glu Thr Asp Leu
273     50                55                60
274 Gln Ala Lys Met Lys Lys Leu Gln Ser Met Lys Ala Gly Ser Asp Arg
275 65                70                75                80
276 Thr Lys Leu Val Thr Arg Ile Gln Thr Ala Val Lys Ser Val Ala Asn
277             85                90                95
278 Leu Glu Lys Asp Val Met Ala Gln Arg Gln Thr Ser Gln Asp Ile Asp
279         100               105               110
280 Leu Val Val Asp Ala Asn Ala Val Ala Tyr Asn Ser Ser Asp Val Phe
281         115               120               125
282 Ala Gln Lys Ala Gln Ala Phe Glu Gln Asp Arg Ala Arg Arg Ser Asn
283     130               135               140
284 Glu Glu Arg Gly Lys Lys Asp Ile Thr Ala Asp Val Leu Lys Gln Val
285 145               150               155               160
286 Lys
290 <210> SEQ ID NO: 10
291 <211> LENGTH: 161
292 <212> TYPE: PRT
293 <213> ORGANISM: Streptococcus typhi
```

RAW SEQUENCE LISTING ERROR SUMMARY   DATE: 05/22/2002
PATENT APPLICATION: US/10/018,290A   TIME: 13:47:34

Input Set : **A:\DAVI149SEQLIST.TXT**
Output Set: **N:\CRF3\05222002\J018290A.raw**

<u>Please Note:</u>
Use of n and/or Xaa have been detected in the Sequence Listing. Please review the
Sequence Listing to ensure that a corresponding explanation is presented in the <220>
to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:13; Xaa Pos. 197,198

VERIFICATION SUMMARY   DATE: 05/22/2002
PATENT APPLICATION: US/10/018,290A   TIME: 13:47:34

Input Set : **A:\DAVI149SEQLIST.TXT**
Output Set: **N:\CRF3\05222002\J018290A.raw**

L:15 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:398 M:281 W: Numeric Fields not Ordered, <221> Sort in ascending order!
L:402 M:258 W: Mandatory Feature missing, <220> not found for SEQ ID#:13
L:427 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:13 after pos.:192